

## CLAIMS

### WE CLAIM:

1. A horizontal surface plasmon resonance instrument for use with a sample cell having a metallic film with probe molecules attached to a first side of the film exposable to material flow across the first side of the film and having a transparent support attached to a second side of the film opposite the first side, the horizontal  
5 surface plasmon resonance instrument comprising:  
a support frame having:
  - a) an entrance providing a path for receiving an analyzing light beam along a first fixed axis;
  - b) an exit for providing a path for transmitting a modified light beam  
10 along a second fixed axis; anda holder for supporting the sample cell with the metallic film in a horizontal orientation;  
an optical assembly for adjustably directing the analyzing light beam received along the first axis at one of a range of incident angles at the second side of  
15 a film of a sample cell in the holder and for directing reflected light received at a corresponding one of a range of reflection angles from the second side of the film back along the second axis.
2. The horizontal surface plasmon resonance instrument of claim 1 wherein the first fixed axis and the second fixed axis are substantially aligned and horizontal.
3. The horizontal surface plasmon resonance instrument of claim 1 including a single operator communicating with the optical assembly to simultaneously change the angle of incidence and reflection by the same amount.
4. The horizontal surface plasmon resonance instrument of claim 1 including a coupling prism having a first prism face adjacent to the second side of the film and receiving from the optical assembly at a second prism face the analyzing light beam directed toward the second side of the film and, providing to the optical assembly

5 through a third prism face, the modified light beam reflected from the second side of the film.

5 5. The horizontal surface plasmon resonance instrument of claim 1 wherein the optical assembly includes a correction mechanism adjusting the position of the analyzing light beam incident on the second prism face and correcting the offset of the modified light beam from the third prism face caused by refraction of the prism with different angles of incidence and reflection.

6. The horizontal surface plasmon resonance instrument of claim 1 wherein the optical assembly is constructed of movable planar mirrors.

7. The horizontal surface plasmon resonance instrument of claim 6 wherein the optical assembly includes a first mirror receiving the analyzing light beam through the entrance along the first axis and directing the analyzing light beam at a third fixed angle to a second mirror moving about a point near the second side of the film in the holder;

and wherein the optical assembly further includes a third mirror movable about the point near the second side of the film in the holder to receive the reflected modified light beam from the second side of the film and directing the modified light beam at a fourth fixed angle to a fourth mirror transmitting the modified light beam to the exit along the second axis.

8. The horizontal surface plasmon resonance instrument of claim 7 wherein the second and third mirrors are mounted on four-bar linkages to adjust a normal angle of the second mirror to substantially half way between the third fixed angle and an angle of an axis between the second mirror and the second surface of the film, and to adjust a normal angle of the second mirror to substantially half way between the fourth fixed angle and an angle of an axis between the center of the third mirror and the point near the second surface of the film.

9. The horizontal surface plasmon resonance instrument of claim 8 including an angulation mechanism communicating with the four-bar linkages for swinging

the second and third mirrors simultaneously by equal angles about the point on the second side of the film.

10. The horizontal surface plasmon resonance instrument of claim 9 wherein the angulation mechanism is a pair of cams adapted to move in unison along a vertical axis each cam engaging an opposite arm of one of the four-bar linkages of the second and third mirrors to urge them simultaneously to different angulations.

11. The horizontal surface plasmon resonance instrument of claim 7 including a tracking mechanism communicating with the first and fourth mirrors to slide the first and fourth mirrors horizontally to conduct the light to and from the second and third mirrors with movement of the second and third mirrors.

12. The horizontal surface plasmon resonance instrument of claim 11 wherein the tracking mechanism a first vertical arm extending from the first mirror to follow the horizontal position of the second mirror and a second vertical arm extending from the fourth mirror to follow the horizontal position of the third mirror.

13. The horizontal surface plasmon resonance instrument of claim 11 including a coupling prism having a first prism face adjacent to the second side of the film and receiving from the optical assembly at a second prism face, the analyzing light beam directed toward the second side of the film and providing to  
5 the optical assembly through a third prism face the modified light beam reflected from the second side of the film;

wherein the first and second vertical arms provide a camming surface communicating with the second and third mirrors, respectively, and wherein the camming surfaces are profiled to modify the relative horizontal location of the first  
10 and second mirrors and the fourth and third mirrors with angulation of the second and third mirrors about the point near the second side of the film;

whereby refractive effects of the prism with angulation of the incident and reflected light may be corrected.

14. The horizontal surface plasmon resonance instrument of claim 1 including light source directing the analyzing light beam along the first fixed axis and a camera receiving the modified light beam along the second fixed axis.

15. The horizontal surface plasmon resonance instrument of claim 1 wherein the holder supports the sample cell with the first side of the film facing upward.